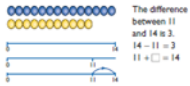



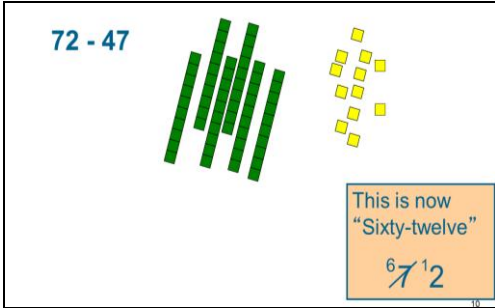


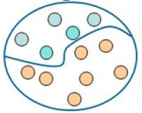
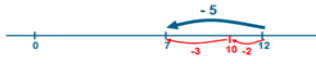
Number-Addition and subtraction


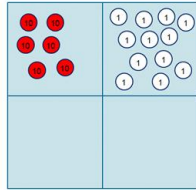

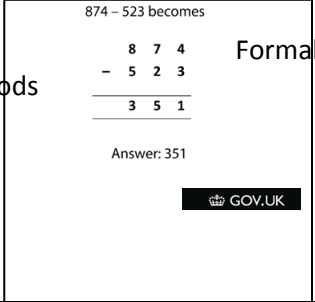
- Key idea: use of concrete objects and pictorial representations
- Key idea: addition and subtraction taught together
- Common themes : ‘increasingly larger numbers’ and ‘efficient written methods of columnar addition and subtraction’

U & A opps New ideas, concepts, terminology

	Programme of study (statutory)	Notes and guidance (non-statutory)	Comments	Glossary & examples
1	Addition and subtraction Pupils should be taught to: <ul style="list-style-type: none"> • read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20 including zero • solve simple one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as: $7 = \square - 9$. 	Addition and subtraction Pupils memorise and reason with number bonds to 10 and 20 in several forms (e.g. $9 + 7 = 16$; $16 - 7 = 9$; $7 = 16 - 9$). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations. Pupils combine and increase numbers, counting forwards and backwards. They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms put together, add, altogether, total, take away, distance between, difference between, -more than and less than so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.	<ul style="list-style-type: none"> • Addition and subtraction taught together as per Derek Haylock • Not just numbers bonds that equal ten and twenty!!! <p>➤ Children now expected to do more – using number facts to 20</p> <p>➤ More prescriptive</p> <p>➤ Now children have to solve simple word problems – using concrete objects and pictorial representations (moved from U&A from old curriculum)</p>	<p>Children’s understanding will be underpinned by exploration. Images, practical resources and their own representations of familiar practical contexts will scaffold the introduction of symbols.</p> <div data-bbox="1523 526 1747 750"> </div> <div data-bbox="1769 526 2083 798"> <p>Here, a 5 year old develops his own short hand to demonstrate his understanding of subtraction.</p> <p>© atm.org.uk</p> </div> <p>Developing the concept of addition and subtraction</p> <p>Use a range of concrete objects and pictorial representations including:</p> <div data-bbox="1500 1053 2105 1340"> </div>

2	<p>Addition and subtraction</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • solve problems with addition and subtraction: <ul style="list-style-type: none"> ○ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ○ applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> ○ a two-digit number and ones ○ a two-digit number and tens ○ two two-digit numbers ○ adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems. 	<p>Addition and subtraction</p> <p>Pupils extend their understanding of the language of addition and subtraction to include sum and difference. Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using $3 + 7 = 10$, $10 - 7 = 3$ and $7 = 10 - 3$ to calculate $30 + 70 = 100$, $100 - 70 = 30$ and $70 = 100 - 30$. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (e.g. $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$). This establishes commutativity and associativity of addition. Recording addition and subtraction in columns supports place value and prepares for efficient written methods with larger numbers.</p>	<ul style="list-style-type: none"> • An emphasis on preparing for columnar addition and subtraction alongside mental and other methods. 	<p>Sum means the total of a set of numbers; the whole amount (not a “calculation”) e.g. the sum of 3 and 5 is 8.</p> <p>Difference means the result of subtracting one number from another e.g. the difference between 5 and 2 is 3. This should be represented practically and visually, e.g.:</p>  <p>Preparing for efficient written methods: place value activities (e.g. re-partitioning) will support pupils’ manipulation of number in readiness for developing column methods e.g.</p> $83 + 42 = 80 \text{ and } 3 + 40 \text{ and } 2$ $120 \text{ and } 5 = 125$ <p>Commutativity means that same answer is achieved in a calculation (addition and multiplication) however the numbers are ordered e.g. $3 + 6 = 6 + 3$</p> <p>Associativity means it doesn’t matter how you group the numbers when you add (and multiply) e.g.</p> 
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3	<p>Addition and subtraction</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> add and subtract numbers mentally, including: <ul style="list-style-type: none"> a three-digit number and ones a three-digit number and tens a three-digit number and hundreds add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction estimate the answer to a calculation and use inverse operations to check answers solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. 	<p>Addition and subtraction</p> <p>Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100. Pupils should use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent. (see Mathematics Appendix 1)</p>	<p>1. Specific reference to solving problems with three-digit numbers</p> <p>2. Children are expected to use the estimate to check answers – continued from Year 2</p>	<p><i>Dictionary definition of Columnar adj.</i></p> <ol style="list-style-type: none"> Having the shape of a column. Constructed with or having columns. <p>Place value and partitioning to support columnar methods</p> 
4	<p>Addition and subtraction</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate estimate and use inverse operations to check answers to a calculation solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. 	<p>Addition and subtraction</p> <p>Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (see Appendix 1).</p>	<p>➤ Children should be confident in using column methods with increasingly large numbers</p> <p>➤ Also expected to do the same mentally with at least 2-digits</p>	<p>Different methods for solving subtraction problems:</p> <p>(1) Removing items from a set.</p>  <p>(2) Comparing two sets / difference</p>  <p>(3) Partitioning a set / Using known facts</p>  <p>Seeing 12 as made up of 5 and 7</p> <p>(4) Using number lines – counting back</p> 

				<p>5) Using number lines – finding the difference</p>   <p>(6) methods</p>  
5	<p>Addition and subtraction</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • add and subtract whole numbers with more than 4 digits, including using efficient written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<p>Addition and subtraction</p> <p>Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency (see Appendix 1). They should practise mental calculations with increasingly large numbers to aid fluency (e.g. $12\ 462 - 2\ 300 = 10\ 162$).</p>	<p>No mention of adding or subtracting decimal numbers</p>	<p>Deciding on operations and methods</p> <p>Strategies to use when adding two or more numbers:</p> <ul style="list-style-type: none"> ➤ count on from the largest number ➤ re-order the numbers ➤ partition the numbers into 100s 10s and ones ➤ bridge through 10 and multiples of 10 ➤ add 9, 11 etc by adding a multiple of 10 and compensating ➤ use near doubles ➤ use knowledge of number facts <p>Which method works best? Why? How else could we do it?</p> <p>Levels of accuracy</p> <p>Can we have half a person? How many decimal places do we need when we write amounts in pounds?</p>

From Appendix 1 ©

6	<p>Addition, subtraction, multiplication and division</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. perform mental calculations, including with mixed operations and large numbers identify common factors, common multiples and prime numbers use their knowledge of the order of operations to carry out calculations involving the four operations solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why solve problems involving addition, subtraction, multiplication and division use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. 	<p>Addition, subtraction, multiplication and division</p> <p>Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1). They should undertake mental calculations with increasingly large numbers and more complex calculations. Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.</p> <p>Pupils round answers to a specified degree of accuracy, e.g. to the nearest 10, 20, 50 etc, but not to a specified number of significant figures.</p> <p>Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$</p> <p>Common factors can be related to finding equivalent fractions.</p>	<ul style="list-style-type: none"> ‘Addition and subtraction’ in Years One to Five moves to ‘Addition, subtraction, multiplication and division’ in Year Six. <p>➤ No mention of adding or subtracting decimal numbers</p> <p>➤ Main difference is that all calculations are considered to be used together, with fluency in a variety of contexts</p>	<p>Mathematical Statements</p> <p>A meaningful composition of words which can be considered either true or false is called a mathematical statement or simply a Statement. A single letter shall be used to denote a statement. For example, letter ‘p’ may be used to stand for the statement “ABC is an equilateral triangle.” Thus, $p = ABC$ is an equilateral triangle</p> <p>Order of Operations means which order operations are carried out in, when a calculation involves more than one.</p> <div data-bbox="1473 539 2112 1265"> <p style="text-align: center;">BIDMAS</p> <p style="text-align: center;">Brackets Indices Division Multiplication Addition Subtraction</p> <p>BIDMAS is a mnemonic to help us to remember the correct order in which to do calculations. If we had, say, $7 + 3 \times 2$ and did the calculation from left to right $7 + 3 = 10$. We then multiply by 2 and the answer is 20</p> <p>This answer is wrong because we did the calculation in the wrong order. BIDMAS tells us that we must do multiplication before addition. So, 3×2 is 6. We can add the 7 now to get 13. By using BIDMAS we get the correct answer. Always resolve Brackets first. Then Indices. Division and/or Multiplication next and finally Addition and/or Subtraction.</p> <p>©www.bidmas.com</p> </div>
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